RESTRICTED CIRCULATION

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AGRICULTURAL MEMORANDUM NO 562

Wool quality and frequency of heavy rain - L P Smith

Agricultural Memorandum 561 used frequency of thunder as the meteorological parameter; this was available from a good selection of observing stations, but was not the most preferable representation of the critical weather in relation to mycological dermatitis, (thought to be periods of heavy rain).

Table 6A gives details of intense rainfalls in the annual volumes of British Rainfall for a limited number of stations.

If the data for each station therein are allocated to counties, then weighted with respect to total number of sheep per county to give Wool Marketing Board area means, then weighted with respect to weight of wool clip to give a mean for England, Scotland and Wales, then the proportion of 'cast' wool can be compared with the occurrences of heavy rainfalls.

The distribution of Table 6A stations is not outstandingly good in relation to the sheep areas, but the best has to be made of available data. The resulting weighted means are therefore not true areal means, but only indicators of them; they cannot be used for inter-area comparisons, but can be used in inter-year analysis.

The significant heavy rain was selected as 5 mm in 15 minutes.

Fine Wools The distribution of fine wool sheep over the counties is not known so that the weighting to WMB areas may be in error; the subsequent weighting to a national mean is based on fine wool totals. The results were:-

	Wool Percentage Cast (C_F)	Rain factor last year (R_1)	Rain factor last year but one (R_2)
1963	30.2	0.86	1.87
1964	33.7	1.67	0.86
1965	40.3	1.89	1.67
1966	33.9	1.72	1.89
1969	52.2	2.97	2.38
1970	45.9	1.87	2.97
1971	31.6	1.19	1.87

Partial correlations are C_F on R_1 0.951

C_F on R_2 0.817

Multiple correlation C_F on R_1 & R_2 0.97

Formula $C_F = 9.8R_1 + 4.7R_2 + 12.2$

Half-Bred Wools The same reservations about county weighting apply, probably to a greater extent as much of this wool comes from the Northern region with poor county representation in Table 6A.

	Wool Percentage Cast (C_H)	Rain factor last year (R_1)	Rain factor last year but one (R_2)
1963	27.0	1.26	1.75
1964	27.1	1.56	1.26
1965	31.4	1.71	1.56
1966	30.3	1.19	1.71
1969	42.7	2.40	1.97
1970	40.9	1.68	2.40
1971	32.0	1.34	1.68

Partial correlations are C_H on R_1 0.867

C_H on R_2 0.919

Multiple correlation C_H on R_1 & R_2 0.97

Formula $C_H = 8.8R_1 + 11R_2 - 0.5$

Total Wool Here the county weightings are hopefully more reliable.

	Wool Percentage Cast (C)	Rain factor last year (R_1)	Rain factor last year but one (R_2)
1963	28.8	1.03	1.75
1964	30.3	1.64	1.03
1965	35.6	1.82	1.64
1966	32.0	1.46	1.82
1969	47.6	2.71	2.13
1970	43.4	1.75	2.71
1971	31.8	1.28	1.75

Partial correlations C on R_1 0.988

C on R_2 0.976

Multiple correlations C on R_1 & R_2 0.994

Formula $C = 9.6R_1 + 7.2R_2 + 6.5$

with a standard error of estimates 0.98.

which suggests that the quality of the wool can be forecast some 6 months in advance from knowledge of heavy rains during the two previous calendar years.

Other Rainfall Criteria

The data for 15 mm of rain within 4 hours was also analysed in the same way, giving for the total wool clip,

Partial correlation on last year 0.753

on last year but one 0.822

This is inferior to the 5mm in 15 minutes criteria.

Conclusions

Mycological dermatitis is thought to spread during periods of heavy rain.

Fleece quality is very highly correlated with such rainfalls.

This suggests that dermatitis plays a large part in determination of fleece quality.

It should be possible to forecast wool gradings from weather data.

The influence of the intense rains of the previous calendar year is explicable by the fact that most of them occurred after shearing-time. The influence of the data for the rains two years previous to shearing is probably through the effect on infection sources.

Any comments or suggestions on this paper should be referred to the author.

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